AIRDRIE • BEISEKER • BIGHORN • BLACK DIAMOND
BLACKIE • CALGARY • CANMORE • CAYLEY
CHESTERMERE LAKE • CLUNY • COCHRANE • CROSSFIELD
FOOTHILLS • GHOST LAKE • GLEICHEN • HIGH RIVER • HUSSAR
I.D. 88 • IRRICANA • LONGVIEW • OKOTOKS • ROCKY VIEW • ROCKYFORD
STANDARD • STRATHMORE • TURNER VALLEY • WAIPAROUS • WHEATLAND

Prospect '89

Inside this issue:
INFRASTRUCTURE:
REGIONAL UTILITIES

CALGARY REGIONAL PLANNING COMMISSION, SEPTEMBER 1989

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PROSPECT 1989:

INFRASTRUCTURE: REGIONAL UTILITIES

REGIONAL PLANNING SERVICES
CALGARY REGIONAL PLANNING COMMISSION
SEPTEMBER 1989

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1.0 INTRODUCTION

This report takes the findings of the 1980 Calgary Regional Utilities Study and examines them from a 1989 perspective. It does this by using new municipal population projections prepared by the Calgary Regional Planning Commission, by looking at local changes to land use planning during the 1980 - 1989 period, and by looking at the age of our water and sewage systems.

To set the context for this report, the 1980 Calgary Regional Utilities Study is summarized, including its recommendations. The Calgary Regional Utilities Study was done in the late 1970's and into 1980 at a time when economic and population "boom conditions" existed. Rapid growth was occurring and more was expected. This previously unforeseen level of development generated the need to consider regional systems for water and sewage.

2.0 SUMMARY AND RECOMMENDATIONS OF CALGARY REGIONAL UTILITIES STUDY

The Calgary Regional Utilities Study (1980) evaluated the alternatives available to provide adequate water supply and sewage disposal facilities to accommodate the projected growth within the study area to the year 2006, the study design year.

Existing land uses were reviewed and discussions held with various departments and agencies to determine what developments may occur that would affect the Region's future land use pattern and influence urban development.

The Study found that the availability of groundwater in the region was limited and that future water demands in the Study area would depend upon three things:

1. Population growth

2. Industrial and agricultural expansion
3. Policy decisions regarding water conservation and the overall use of water in the South Saskatchewan River Basin.

The irrigation districts were identified as the largest water users. During periods of low flows, it was felt that there would not be sufficient water in the Bow River to meet the projected demands unless there was a change in direction with respect to water management in the Bow River Basin. The fishery and recreational resources of the Highwood and Sheep Rivers were described as sensitive to high water withdrawals and rivers may not be able to accommodate the municipalities' projected demands for water supply or sewage disposal.

At the time the Study was published in 1980, water management was being evaluated by the South Saskatchewan River Basin Study.

The Study area, shown in Figure 1, includes those communities within a 33 to 55 km radius of Calgary. Specifically, all of the Municipal District of Rocky View No. 44, Municipal District of Foothills No. 31 plus Strathmore and Carseland in the County of Wheatland No. 16 were within the Study boundary. The consultants were directed to consider those communities which were projected to reach a population of 500 or more by the year 2006. Springbank Airport was an exception to this rule.

Key assumptions were made regarding future development. These were:

1. There will be no fundamental changes to the present planning process.

2. Rate of growth of individual municipalities would be responsive to local preferences and pressures.

3. No new urban areas or satellite towns would be developed.

4. The City of Calgary will be allowed to grow to the R.D.A. and beyond.

5. Country residential development will continue to the west and south of Calgary on the poorer agricultural soils.

6. Water and Sewage Services would be provided to accommodate the projected growth and not determine where growth would take place.

7. Agriculture will continue to be the dominant land use and no major industrial developments are foreseen within the Study area. Secondary manufacturing and commercial developments will continue to locate in Calgary with some locating in the nearby (urban) communities.

One condition was attached to these predictions. It was that any major shift in the regional policies on rural industrial development might have significant economic implications and alter existing land use patterns.

The study's population projections are shown in Table 1:

TABLE 1

POPULATION PROJECTIONS

Community	1979*	(2006) Design Population
Airdrie	3,883	50,000
Beiseker	475	2,500
Black Diamond	1,354	5,000
Blackie	329	1,000
Bragg Creek	447	5,000
Carseland	100	2,000
Cayley	154	750
Chestermere Lake	352	12,000
City of Calgary	531,000	1,268,400
Cochrane	2,309	40,000
Crossfield	955	9,000
High River	4,015	18,000
Irricana	394	3,000
Longview	246	500
Okotoks	2,629	40,000
Redwood Meadows	N/A	9,000
Stathmore	2,500	35,000
Turner Valley	1,177	5,000
TOTAL:	552,319	1 379,750

*Source: 1979 Municipal Census

All other communities are projected to be below 500 people.

The following is a list of recommended regional water and sewage systems. Figures 2 and 3 show these systems in map form.

Water Supply

The recommended systems for the region were a combination of independent and subregional and regional systems. It included the following:

Municipality	Recommended System
Airdrie	Supply from Calgary
Black Diamond	
Carseland	
Chestermere Lake	
Cochrane	
Crossfield	
High River	
Okotoks	
Springbank Airport	
Strathmore	
Turner Valley	
Beiseker	Subregional supply from WID canal
Irricana	
Bragg Creek	Subregional supply from Elbow River
Redwood Meadows	
Blackie	Independent systems based on local sources
Cayley	
Longview	

A subregional system for Black Diamond and Turner Valley was considered economically viable but not acceptable due to environmental concerns based on existing information for the Sheep River.

Sewage Treatment and Disposal

Municipality	Recommended System
Airdrie Chestermere lake Cochrane Okotoks Redwood Meadows	To Calgary system
Beiseker Blackie Carseland Irricana	Expansion of existing lagoon system
Black Diamond	Pipeline connection to Okotoks
Bragg Creek	Pipeline connection to Redwood Meadowns system and thence to Calgary
Cayley	Construction of new lagoon system
Crossfield	Pipeline connection to Airdrie system and thence to Calgary
High River	Construction of new secondary treatment plant with phosphorus removal facilities
Longview	Upgrading of existing secondary treatment system

Sewage Treatment and Disposal - continued

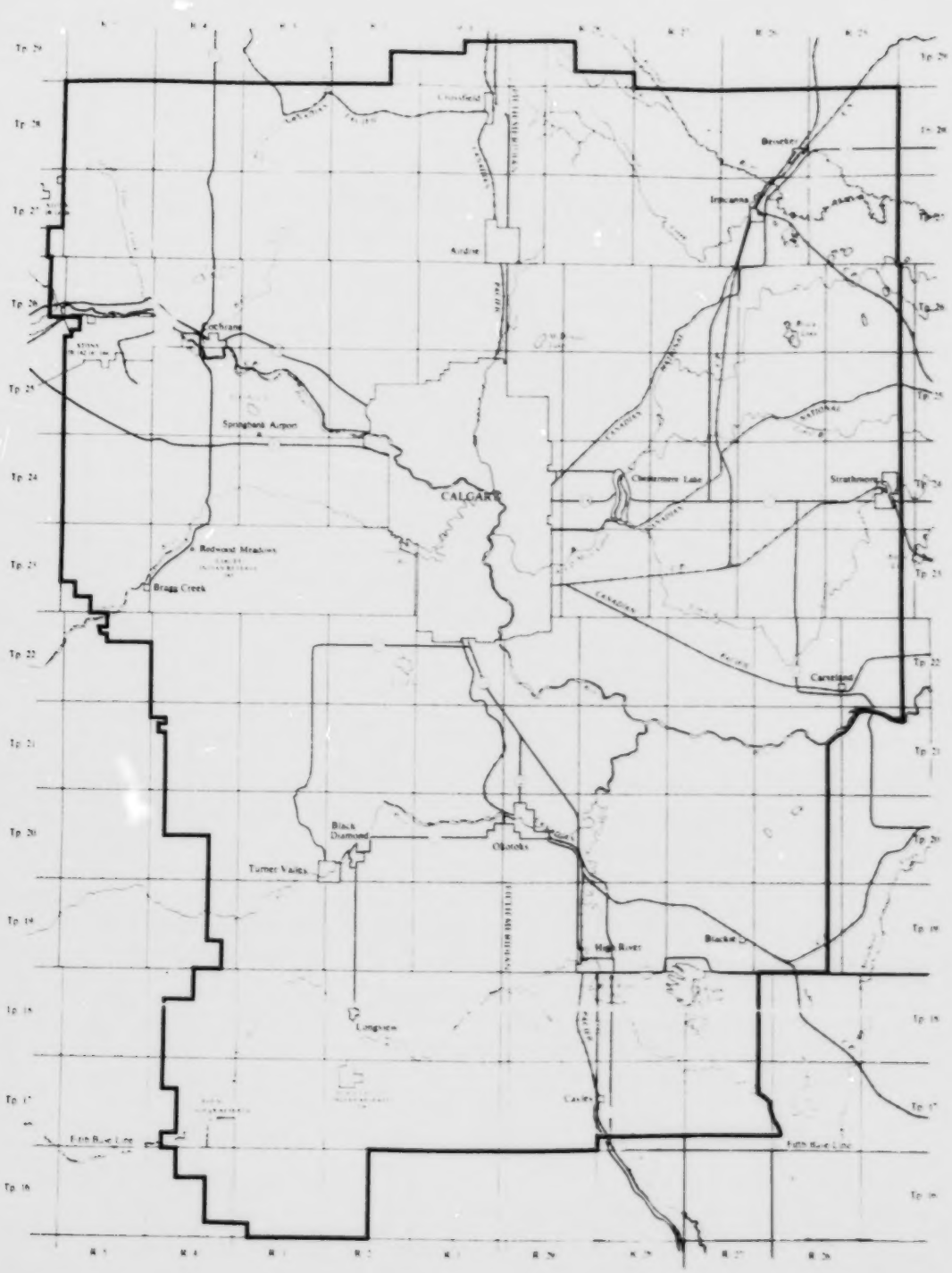
Municipality	Recommended System
Springbank Airport	Continuance of existing spray irrigation system
Strathmore	Pipeline connection to Chestermere Lake system and thence to Calgary
Turner Valley	Pipeline connection to Black Diamond system and thence to Okotoks and on to Calgary

Costs

The Study also determined costs in 1980 dollars for the proposed systems. These are contained in Appendix I. Current costs for these systems were not calculated. It is recognized that these costs would be higher than the 1980 costs and would play a very important part in the decision to construct part of a regional system.

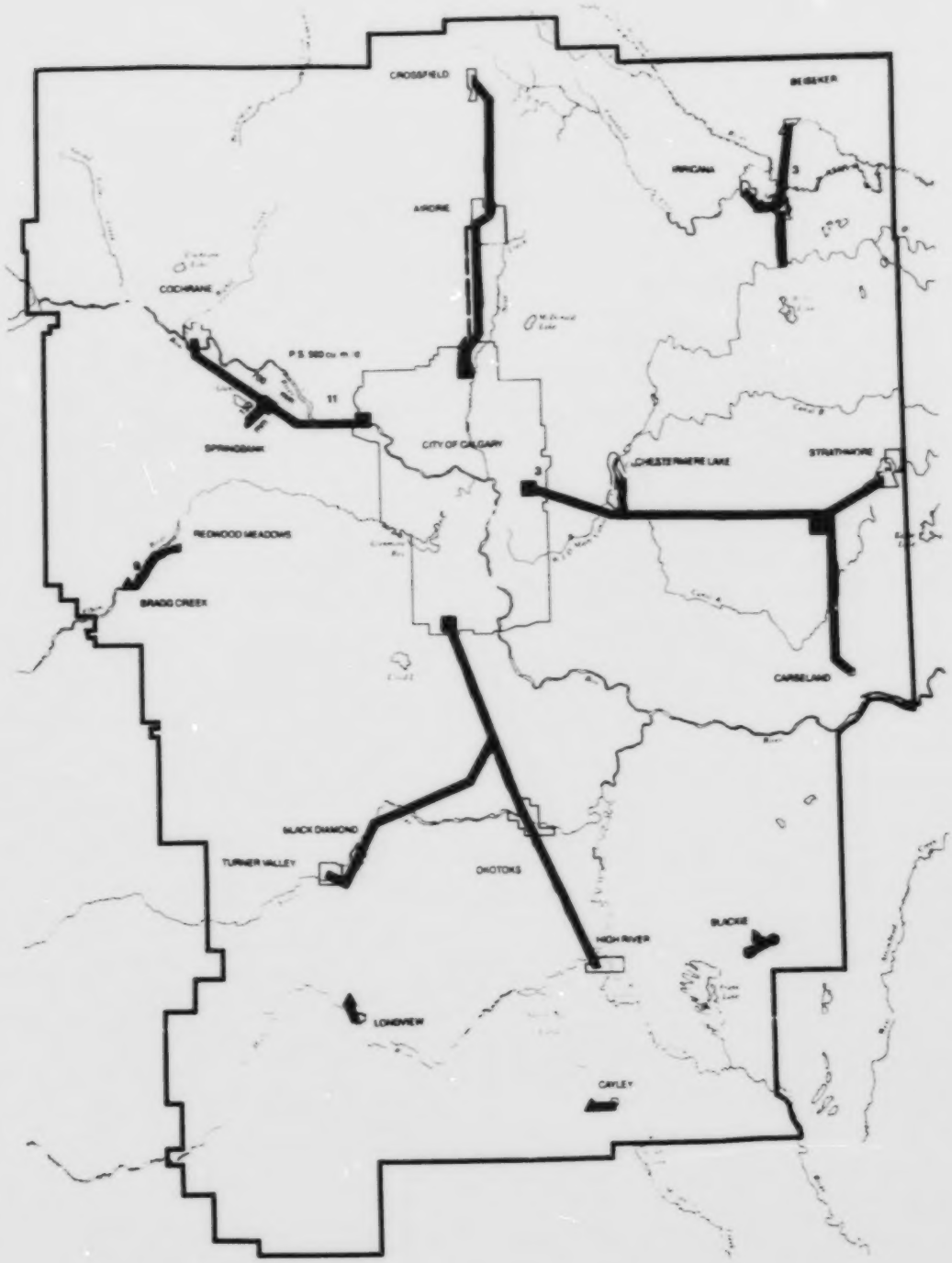
Calgary Regional Utilities Study

Figure 1
The Study Area



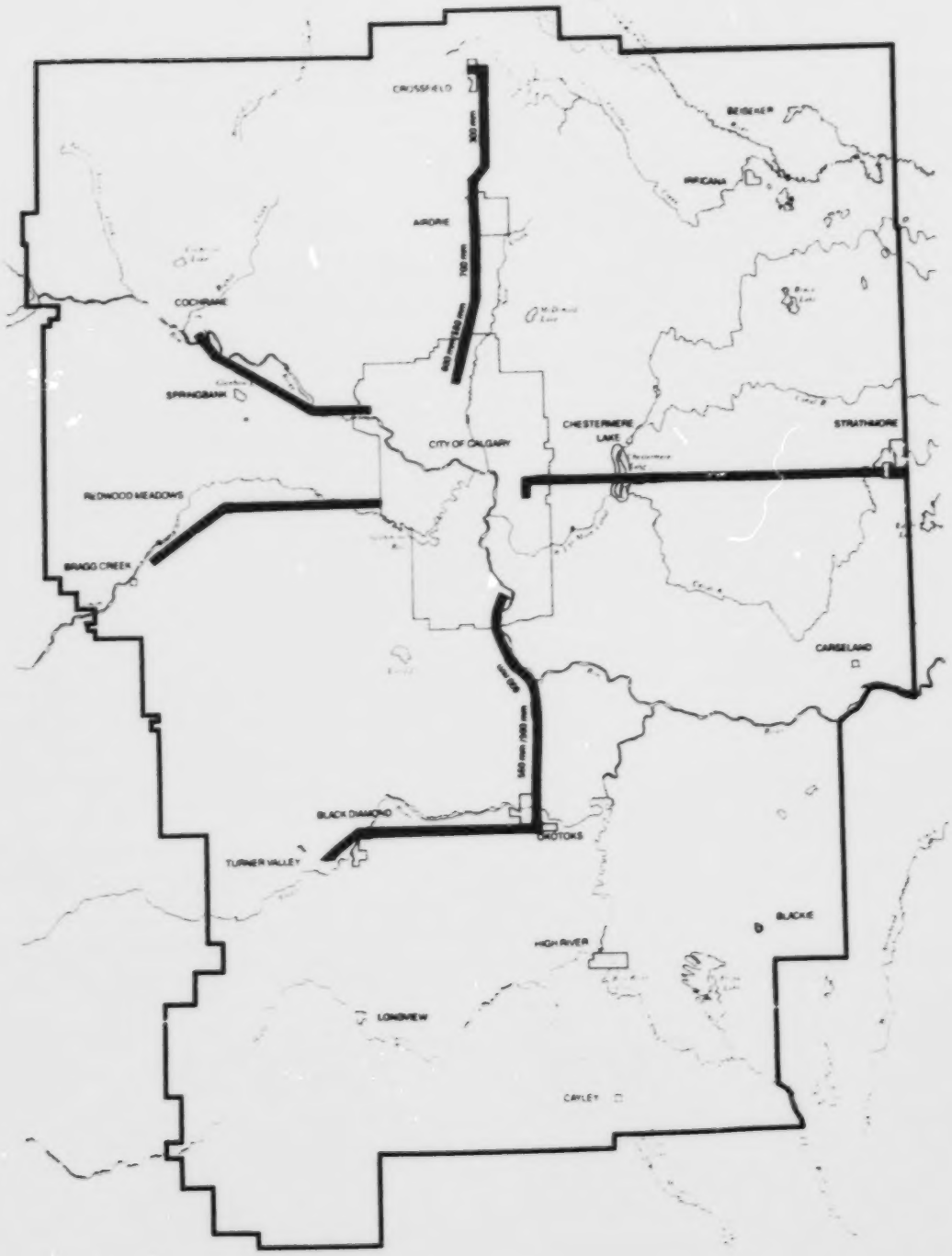
Calgary Regional Utilities Study

Figure 2
Recommended System Water Supply



Calgary Regional Utilities Study

Figure 3
Recommended System Sewage Disposal



3.0 CALGARY REGIONAL PLANNING COMMISSION POPULATION PROJECTIONS

As detailed in our Prospect '89 Population Report, various projections have been made for selected regional municipalities. The projection period runs until 2011, but for the purposes of this report, we will use the year 2006 so as to make our projections comparable for the Regional Utility Study projections. Our projections do not include all those municipalities contained in the Study area so the comparisons will be made between only those municipalities contained in the Study area and also contained in our Prospect '89 Population Report. This amounts to six of the region's larger urban centres and is sufficient to show the degree of difference between the two sets of projections.

For each municipality the Calgary Regional Planning Commission has produced three projections, assuming constant fertility, with a low, average and high migration rate. Below in Table 2 are two sets of projections, both done by the Calgary Regional Planning Commission, one done in 1980, the other done in 1989.

Table 2
Population Projection Comparisons

Calgary Regional Utilities Study Projections, 1980	Calgary Regional Planning Commission Projections 1989
2006	2006
Airdrie - 50,000	low mig. - 15,747 average mig. - 29,664 high mig. - 43,628
Calgary - 1,268,400	low mig. - 818,000 average mig. - 874,200 high mig. 909,400
Cochrane - 40,000	low mig. - 6,043 average mig. - 10,044 high mig. - 14,062
High River - 18,000	low mig. - 6,170 average mig. - 9,628 high mig. - 11,209
Okotoks - 40,000	low mig. - 10,776 average mig. - 13,466 high mig. - 16,134
Strathmore - 35,000	low mig. - 5,198 average mig. - 7,569 high mig. - 9,952

The above sets of projections are a product of the time at which they were produced. The growth experienced by most municipalities during the late 1970s resulted in what today seems like extremely high population projections. By comparison, our 1989 projections seem somewhat conservative. In defence of the earlier projections, it should be said that they were:

- the best available at the time;
- produced without the benefit of a computer model (except for the City of Calgary):
- produced as ranges to account for uncertainty but used as a single projection (the highest) for the purposes of utilities design; and
- accompanied by caveats which emphasized that actual population growth could vary substantially depending on changes in the oil and gas industry which subsequently did occur.

Taking the 1989 high migration rate projection for each municipality and comparing it with the 1980 projection, you see that even our current, most optimistic projection does not come close to the 1980 figure.

In contrast to 1980, today's approach towards population increase and municipal growth lacks the sense of urgency which existed then. However, should rapid population increases reappear throughout the region, then increased demands would be placed on municipal water and sewage systems with regional utility systems being discussed again as a reasonable option. Decisions are influenced by our assessment of "today". Should "today" alter, so would our view of regional utility systems.

The following graphs show Calgary Regional Planning Commission's population projections for the region and for the six selected urban municipalities to the year 2011. Comparing these projected populations with the existing municipal water and sewage capacities shown in the box above each municipality's graph, it is apparent that if population increases according to the three migration rates shown, municipalities currently

have significant water and sewage capacities which will allow them to accommodate much higher population levels.

This capacity, which in some cases will allow the municipality to double or treble its population, means that in general our region's municipalities are not in urgent need of major water or sewage system expansion. Depending upon their rate of growth however, municipalities such as Cochrane, Okotoks or Strathmore may require some additional facilities within the next decade or so. If a municipality has sufficient water and sewage capacity, the need for becoming part of a regional utility system may be many years in the future.

Fertility has been held constant and each projection represents an average, low or high migration rate as described below.

Constant Fertility/Average Migration, Low Migration and High Migration

Total Ferility Rate is assumed to remain constant throughout the projection period at rates prevailing in the region in 1986 (1.67 births per woman).

Average Migration

Net Migration estimate is based on the average annual net migration of 11,000 people attracted by the region during the ten year period from 1976 to 1986.

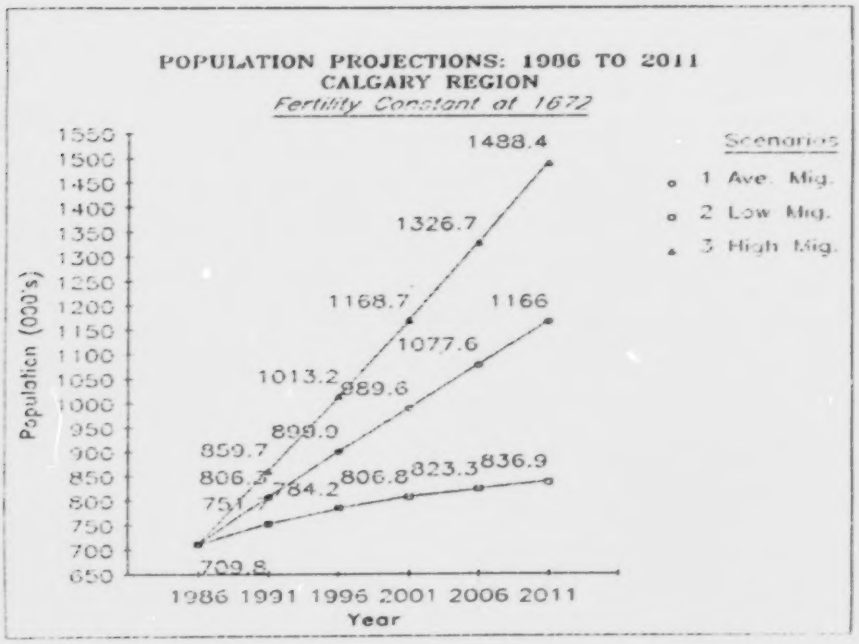
Low Migration

Net Migration estimate is based on the average annual net migration of 700 people attracted by the region during the five year period from 1981 to 1986.

High Migration

Net Migration estimate is based on the average annual net migration of 21,000 people attracted to the region during the five year period from 1976 to 1981.

The population projections for the region show that our population could range from a low of approximately 837,000 people to a high of 1,488,000 in 2011.



3.1 Selected Municipal Population Projections (as contained in Prospect '89 - Population Report)

The selected municipalities are Airdrie, Calgary, Cochrane, High River, Okotoks and Strathmore.

City of Airdrie

AIRDRIE
POPULATION 10,957

Water System

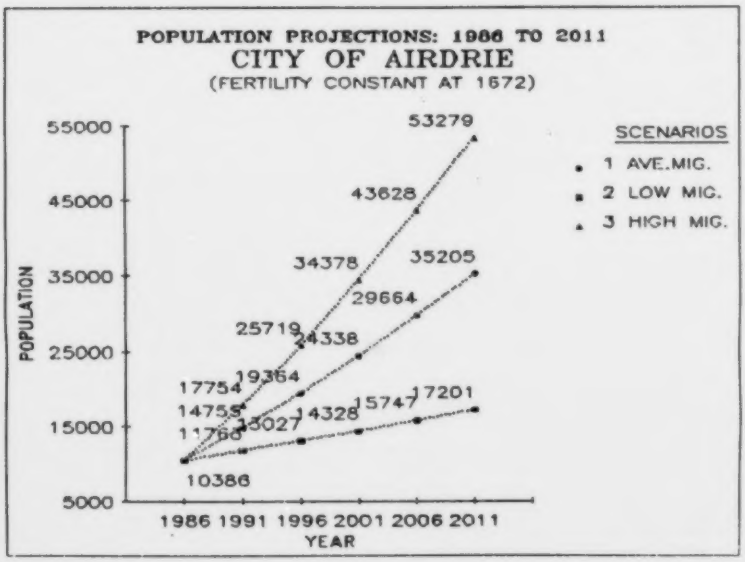
description	population capacity
supply lines (14", 36") from Calgary's Bearspaw water treatment plant	50,000 + @100 igcd*

Sewage System

description	population capacity
line to Calgary	35,000 + @80 igcd

System Capacities

Airdrie's water system capacity may be greater than 50,000. Pumping at greater pressure with the use of large storage reservoirs may increase the capacity. At a 1988 population of about 11,000 the City can quadruple its population before needing extra water capacity and treble its population before requiring additional sewage capacity.



Projections

Based upon the low migration scenario, no new water or sewer capacity will be required between now and 2011. The average migration scenario indicates the need for additional sewage capacity would be required about 2011. The high migration scenario shows the need for additional sewage capacity at 2001, with extra water capacity being required probably before 2011.

* The abbreviation "igcd" stands for imperial gallons per capita per day.

City of Calgary

CALGARY
POPULATION 657,118

Water System

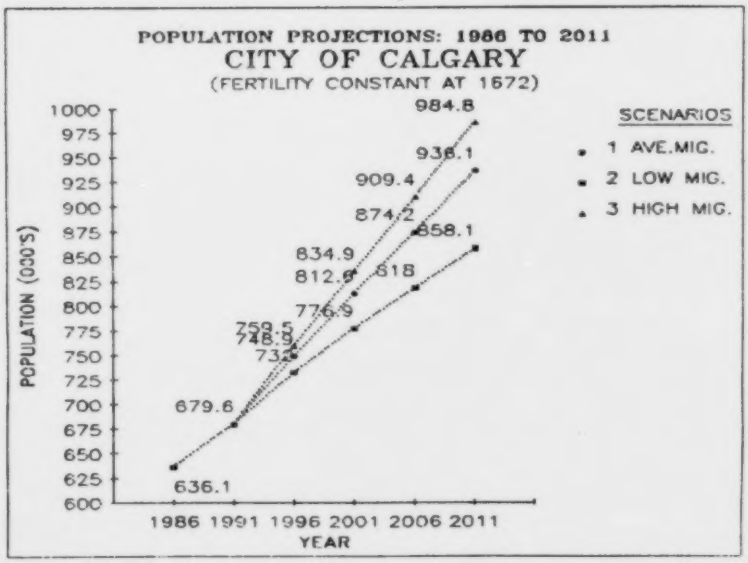
description	population capacity
Bearspaw treatment plant - Bow River; Glenmore treatment plant - Elbow River	no effective limits

Sewage System

description	population capacity
Bonnybrook sewage treatment plant; Fish Creek sewage treatment plant	no effective limits

System Capacities

The City of Calgary has developed long range plans for their water and sewer networks to the year 2025. Details are contained in Appendix 2. These system expansions effectively mean that there will be no population limits for their systems.*



Projections

As there are no effective limits* to system capacity, population levels under each scenario can be accommodated.

*no effective limit
The City of Calgary is continually planning ahead to ensure that sufficient lead time is provided for design and construction of works to meet future demand.

Town of Cochrane

COCHRANE
POPULATION 4,337

Water System

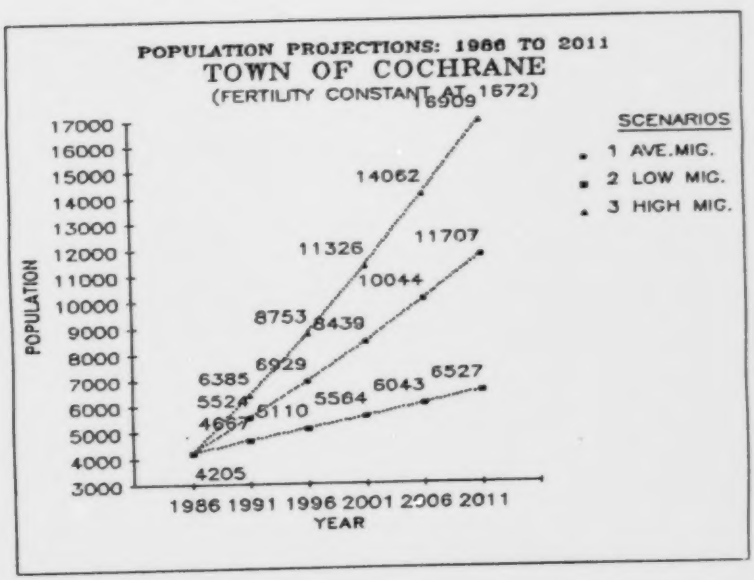
description	population capacity
surface wa ter from Bow River with chemical addition and chlorination	7,000 @100 igcd

Sewage System

description	population capacity
Aerated lagoons with continuous discharge to Bow River	6,400 @100 igcd

System Capacities

At a 1988 population of 4,337 Cochrane can accommodate roughly another 2,500 people with its water system and about 2,000 more people with its present sewage system. According to Alberta Environment, the aerated lagoon system may not be able to accommodate the design population of 6,400.



Projections

The low migration scenario indicates that the projected population to 2011 could be accommodated by the present water system but that the sewage system would likely be at capacity by the end of the projection period. The average migration scenario indicates that both the water and sewage systems would need new capacity near 1996. The high migration scenario indicates that both systems would need more capacity between 1991-1996.

Town of High River

HIGH RIVER
POPULATION 5,096

Water System

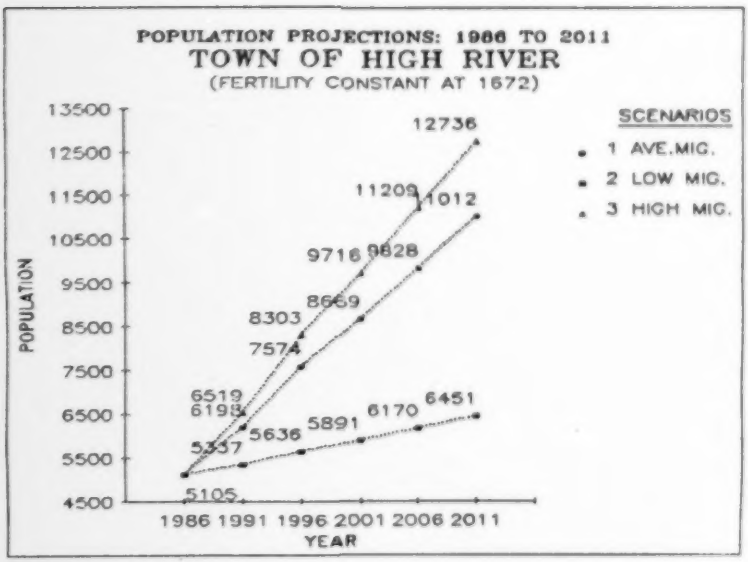
description	population capacity
infiltration wells from Highwood River with filtration and chlorination	12,000

Sewage System

description	population capacity
Aerated lagoons	7,000 @100 igcd

System Capacities

At a 1988 population of 5,096 the Town can more than double its population before needing more water system capacity. High River will be discharging its sewage to the MagCan Plant and to the Frank Lake wetlands project. This means the existing aerated lagoon system with its 7,000 population capacity will no longer apply.



Projections

Existing systems can accommodate the low migration scenario. The existing water system can meet the needs of the average migration scenario. The Town's water system will be at capacity between 2006 and 2011 according to the high migration scenario. The Frank Lake wetlands project will effectively remove population limitations due to sewage capacity. This means that High River will be able to accommodate its sewage requirements for the high migration scenario.

Town of Okotoks

OKOTOKS
POPULATION 5,666

Water System

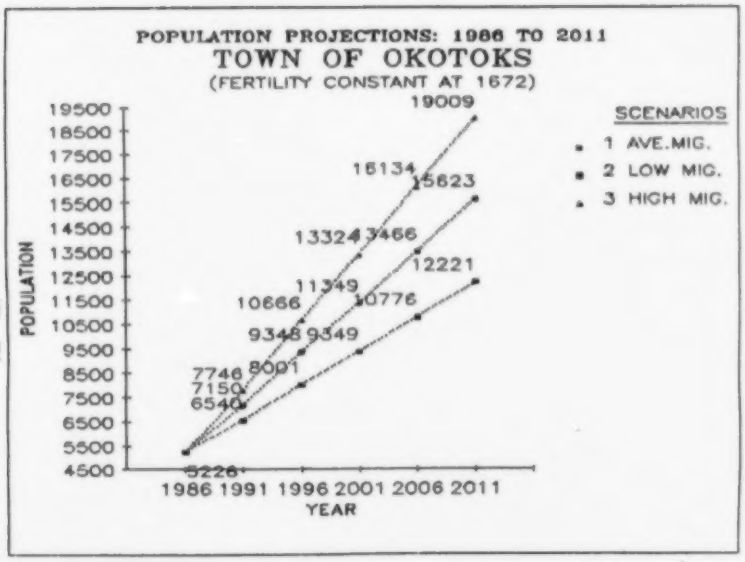
description	population capacity
3 wells with chlorination	10,000 @100 igcd

Sewage System

description	population capacity
mechanical treatment with continuous discharge to Sheep River	10,500 @100 igcd

System Capacities

At a 1988 population of 5,666 the Town's water system can accommodate an increase of about 4,300 people. An additional 5,000 people can be accommodated before the sewage system reaches capacity.



Projections

Based upon the low migration scenario Okotoks will need additional water and sewer capacity between 2001 and 2006. The average migration scenario shows that new water and sewer capacity may be needed between 1996 and 2001. The high migration scenario shows that system capacities may be reached before 1996. With the construction of the Frank Lake wetlands project involving High River, the MagCan and Cargill plants, Okotoks may in the future wish to be part of this subregional system.

Town of Strathmore

STRATHMORE
POPULATION 3,544

Water System

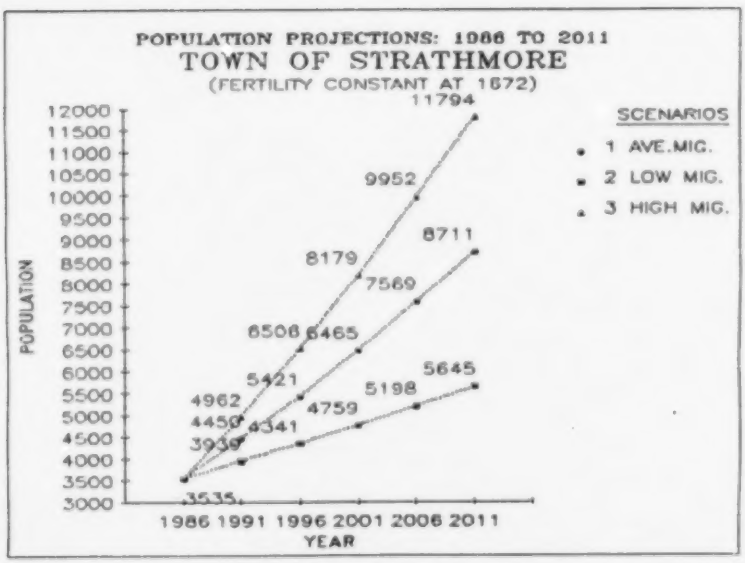
description	population capacity
Surface water from WID Canal, with chemical treatment, softening, filtration and chlorination	10,000 @90 igcd

Sewage System

description	population capacity
Lagoon System - 5 anaerobic cells, 2 facultative cells, 3 storage cells	4,000 @75 igcd

System Capacities

At a 1988 population of 3,544 the Town can almost treble in population before requiring additional water system capacity. Strathmore's sewage system, however, is nearing its population capacity.



Projections

According to the low migration scenario more sewage capacity will be needed by 1991. The average migration scenario would see the need for more sewer capacity before 1991, but no new water capacity would be required during the projection period to 2011. The high migration scenario indicates the need for new sewage capacity prior to 1991 and the new water system capacity near 2006. According to Alberta Environment, Strathmore will likely go with irrigation of their waste water.

Note: Water and Sewage System capacities for Beiseker, Bragg Creek, Black Diamond, Canmore, Chestermere Lake, Crossfield, Irricana and Turner Valley are contained in Appendix 3.

Table 3

Water and Sewage Requirements for Low, Average and High Migration Projections

	WATER	SEWER
AIRDRIE		
Low	0	0
Average	0	2011
High	2011	2001
COCHRANE		
Low	0	2011
Average	1996	1996
High	1991-1996	1991-1996
HIGH RIVER		
Low	0	0
Average	0	0
High	2006-2011	0
OKOTOKS		
Low	2001-2006	2001-2006
Average	1996-2001	1996-2001
High	Before 1996	Before 1996
STRATHMORE		
Low	0	1991
Average	0	Before 1991
High	2006	Before 1991

0 = improvements not required.

This table summarizes the information contained in the previous pages. These projections give an idea of when additional servicing might be required according to three different migration conditions. Each projection represents increasingly higher population levels and, therefore, water and sewer services would be required at the earliest date in the high migration projection. As growth in our region has been of the rollercoaster variety, even though significant capacities do exist, municipalities should consider a range of growth options when doing their long range planning for water and sewer services.

4.0 LOCAL CHANGES TO LAND USE PLANNING

The planning related changes which have occurred in our region since 1980 which may have a bearing on the provision of water and sewage systems are:

1) Policy Development by the Alberta Planning Board in the form of a document called "Rural Industrial Land Use, Some Policy Guidelines for the 1980's", published in January of 1981 after the completion of the Calgary Regional Utilities Study.

2) The new Calgary Regional Plan and the devolution of Subdivision Approving Authority from the regional level to the municipal level.

3) Relaxing of the definition of higher capability agricultural land.

4) Urban Fringe Planning.

4.1 The Rural Industrial Guidelines

The seventh planning related assumption made by the Regional Utilities Study regarding future development, was that no major industrial developments were foreseen within the Study area. The implication was that any movement toward allowing a greater variety of rural industrial development could alter land use patterns, and therefore, its servicing requirements.

The Regional Utilities Study and the Rural Industrial Guidelines had one thing in common. They were both based upon growth conditions. The following extracts from the "guidelines" demonstrate this point.

> "In response to economic growth conditions expected to prevail in the Province during the next decade, the Government of Alberta be-

lieves it appropriate to make known to regional and local planning authorities its views concerning some of the generally preferred arrangements for the accommodations of such growth. In particular, the Government recognizes a need to identify those classes of industrial development activity which most appropriately should be accommodated within established urban communities and those that should be located within rural districts.

This latter consideration emerges, in part, as a consequence of the Government's desire to achieve a greater diversification in the Province's economic base giving rise, as it may, to a need for patterns of industrial land use not necessarily confined strictly to the urban environment."

These guidelines in the form of Provincial policy later became incorporated into our Regional Plan which was ratified by the Minister of Municipal Affairs in 1984. The guidelines were important because they were an attempt to accommodate the industrial growth which was taking place and expected to continue. But more importantly they gave the direction that a wider range of industrial uses should locate in the rural area than had located there previously.

In our region, for the most part, high levels of rural industrial development have not taken place. The signficant exception is the industrial area near Aldsersyde in Foothills which contains the MagCan and Cargill industries. The location of industries in turn have made it possible for High River to discharge its treated sewage into the Frank Lake wetlands project. This is a tailor-made solution to one municipality's sewage needs, but it illustrates the point that policies regarding land use can directly affect municipal utility systems.

4.2 The New Calgary Regional Plan and Subdivision Approving Authority at the Municipal Level

The new Calgary Regional Plan of 1984 was significantly different than

its 1971 predecessor. The new plan signalled a move away from regional control toward more local control over planning matters. The following extract from "Revised Guidelines for Regional Plan Preparation and Review", produced by the Alberta Planning Board in 1982, describes the change:

> "Originally, regional plans were detailed and prescriptive and, in the absence, for the most part, of municipal planning, performed a local as well as regional function. Under the new Act, however, municipalities are given an expanded role, and municipal statutory documents are supplanting the role of the earlier regional plans in performing essentially local control functions.
>
> The increased role of municipalities requires that regional plans should provide guidance for the municipal plans and land use by-laws but without unsurping municipal rights through being unduly restrictive. This can be accomplished by the regional plans being policy documents which provide a framework for managing and guiding regional aspects of growth, leaving the specifics of implementation and local planning matters up to the more detailed and regulatory municipal instruments."

This change in philosophy helped to make it possible for municipalities to become their own Subdivision Approving Authority.

Since 1980, and the publishing of the Calgary Regional Utility Study, four of our region's municipalities (in addition to the City of Calgary) have acquired the right to approve the subdivision of land in their jurisdsiction. They are the M.D.s of Rocky View and Foothills, the City of Airdrie and the Town of Canmore. The first planning related assumption contained in the Calgary Regional Utility Study was that no fundamental changes to the planning process would take place. In some ways this is a fundamental change to the planning process which was in place in 1980 because it brought the detailed control over development to the local level. It may be difficult to perceive what the actual

differences are, but it gave local councils more direct contact and influence over the subdivision of land, which, when it is developed, will require some form of water and sewer services.

4.3 Relaxing of the Definition of Higher Capability Agricultural Land

The fifth planning related assumption made by the Calgary Regional Utilities Study was that country residential development would continue to the west and south of Calgary on the poorer agricultural soils. The better agricultural lands were protected from subdivision until 1986 when an amendment was made to the definition contained in the Regional Plan. This amendment resulted in the current plan definition:

"1.6.3 Agricultural Capability

(a) Higher Capability Agricultural Land: land with Canada Land Inventory Capability for Agriculture Classifications 1 to 3 other than lands in the Rural Part which are described as lots containing 21 acres or less in either:

(i) a certificate of title granted on or prior to the date of approval of this provision by the Alberta Planning Board or the date of ratification of this provision by the Minister, if ratification is required, or

(ii) a written decision of approval of a Subdivision Approving Authority granted on or dated prior to the date of approval of this provision by the Minister, if ratification is required.

At the discretion of the municipality land with other classes of C.L.I. capability for agriculture may be included. The C.L.I. rating may be subject to confirmation from site inspections, farm land assessment records, or other investigations (Amended December 22, 1986.)

(b) Lower Capability Agricultural Lands which are not described as higher capability agricultural lands."

This new definition meant that parcels of 21 acres or less in size which were previously not allowed to be subdivided because they were considered to be good agricultural land, were now treated as though they were poor agricultural land. This opened up the potential for more country residential development, and therefore, an increased need for water and sewage services, in the rural areas outside the Urban Fringe boundary established by the Regional Plan.

4.4 Urban Fringe Planning

Urban Fringe Planning, as it exists today, was not in place in 1980 when the Calgary Regional Utility Study was completed. The current Regional Plan provides for adjacent urban and rural municipalities to amend the Plan to allow a wide range of rural uses, including rural industrial and country residential, to locate in the Urban Fringe areas.

The Regional Plan which was in place in 1980 allowed a certain level of country residential development near to the City of Calgary. Today's Regional Plan allows potentially higher country residential densities near all urban centres, particularly if the urban and rural municipalities are in agreement. In the long term, some of these developments may want to connect to the urban centre's water and sewage systems.

5.0 AGE OF REGIONAL WATER AND SEWAGE SYSTEMS

Municipalities may in the future turn to regional utilities as a solution to their local problems if their local water and sewer systems have aged or decayed to the point to where they need to be replaced. If repair or replacement costs are prohibitive, connection to a regional system may become a viable option. If a large proportion of our regional municipalities require new systems because the existing ones are too old to do the job, regional utilities could become more widespread.

If regional utilities expand in the Calgary Region, it is not likely to be because of the age or condition of their existing systems. Based on a survey of municipal infrastructure in Alberta carried out by Alberta Municipal Affairs in 1987, it was found that most of Alberta's sanitary and storm sewers and the treated water systems are less than 25 years old. For example, 74% of the cities' storm sewer systems are within the quarter century age bracket. For villages, 90% of storm sewers are less than 25 years old. A look at sanitary sewers showed that 60% of those in urban areas are less than 25 years of age. The majority of the treated water distribution systems were also installed in the last 25 years - only 5% of these systems are over 50 years of age. Our regional municipalities conform, on the whole, to the Provincial pattern. If it is accepted that major water and sewage systems are designed for 50 to 100 year life spans, the region is not experiencing problems in this respect. According to the 1987 survey, Calgary, Gleichen and High River are the only regional municipalities which have portions of any of their water and sewage systems which are over 50 years old.

Therefore decaying infrastructure and the high costs of replacement will probably not spur the creation of regional systems. Twenty-five years from now, however, the situation may well be in favour of regional systems due in part to system aging.

6.0 CONCLUSIONS

The 1980 Calgary Regional Utilities Study was done during a time when it seemed the growth would never stop. Its population projections reflected this mood. Our 1989 population projections, by contrast, are more conservative. Municipal water and sewer capacities are high in general throughout the region and can accommodate significant population increases. Changes to the local planning scene have generally brought about a more flexible attitude toward development than existed in 1980. This increased flexibility is one that allows greater rural industrial and country residential development and gives more local control over the subdivision of land. These land use planning changes in turn influence municipal water and sewage requirements. The age of our region's water and sewage systems is not a cause for concern and will not likely lead to system replacement because most of the systems are less than 25 years old.

APPENDICES

Appendix 1

Calgary Regional Utilities Study:
Costs for Recommended Water and Sewage Systems in 1980

Cost of Recommended Water Supply Alternatives (Millions 1980 Dollars)

Airdrie

Water line from Calgary system to line; Airdrie sized to supplement Crossfield

Capital Costs:	$6.72 in 1980
	$0.63 in 1993
	$7.35
Present Worth:	$28.7

Blackie

Expanded existing groundwater system

Capital Costs:	$0.09 in 1980
	$0.09 on 1997
	$0.18
Present Worth:	$0.4

Cayley

Initially upgrade existing facilities. After 1993, new Water Treatment Plant

Capital Costs:	$0.3 in 1986
	$1.0 in 1993
	$1.3
Present Worth:	$1.7

Crossfield

Water line from Airdrie (Calgary) to Crossfield

Capital Costs:	$4.8 in 1980
	$1.0 in 1993
	$5.8
Present Worth:	$7.9

Irricana/Beiseker:

Initially upgrade groundwater; after 1990 joint system; raw water reservoir, Water Treatment Plant and pipelines

Capital Costs:	$1.6 in 1980
	$6.4 in 1990
	$8.0
Present Worth:	$8.7

Appendix 1 - continued

Calgary Regional Utilities Study:
Costs for Recommended Water and Sewage Systems in 1980

Cost of Recommended Water Supply Alternatives (Millions 1980 Dollars)

Longview	Upgrade existing Water Treatment Plant	
	Capital Costs:	$0.1 in 2000
	Present Worth:	$0.4
Bragg Creek/Redwood Meadows	Water Treatment Plant at Bragg Creek; line to Redwood Meadows	
	Capital Costs:	$7.3 in 1980 $2.7 in 1993 $10.0
	Present Worth:	$12.0
Chestermere Lake, Carseland & Strathmore	Water line from Calgary to Chestermere Lake, Strathmore and Carseland	
	Capital Costs:	$13.2 in 1980 $0.2 in 1993 $0.8 in 1999 $14.2
	Present Worth:	$33.9
Springbank, Cochrane	Water line from Calgary to Cochrane with a tie-in for Springbank	
	Capital Costs:	$7.4 in 1980 $0.8 in 1993 $8.2
	Present Worth:	$26.8
Turner Valley, Black Diamond High River, Okotoks	Water line from Calgary serving the communities	
	Capital Costs:	$23.37 in 1980 $ 4.52 in 1993 $(0.07) in 1996 $27.8
	Present Worth:	$58.6

Appendix 1 - continued

Calgary Regional Utilities Study:
Costs for Recommended Water and Sewage Systems in 1980

Cost of Recommended Sewage Alternatives (Millions 1980 Dollars)

Beiseker	Expansion of existing lagoon system	
	Capital Costs:	$ 0.6 in 1980 $ 0.5 in 1992 $ 1.1
	Present Worth:	$ 1.1
Blackie	Expansion of existing lagoon	
	Capital Costs:	$ 0.2 in 1981 $ 0.2 in 1993 $ 0.4
	Present Worth:	$ 0.4
Carseland	Expansion of existing lagoons in 1994	
	Capital Costs:	$ 0.06 in 1980 $ 0.56 in 1991 $ 0.6
	Present Worth:	$ 0.6
Cayley	Abandon existing lagoon and construct new lagoon facilities	
	Capital Costs:	$ 0.25 in 1980 $ 0.16 in 1991 $ 0.4
	Present Worth:	$ 0.4
* High River	Tertiary Sewage Treatment Plant continuous discharge to Highwood River	
	Capital Costs:	$ 5.95 in 1980 $ 4.68 in 1990 $10.6
	Present Worth:	$14.2

* 1989 system: Cargill - MagCan system.

Appendix 1 - continued

Calgary Regional Utilities Study:
Costs for Recommended Water and Sewage Systems in 1980

Cost of Recommended Sewage Alternatives (Millions 1980 Dollars)

Irricana	Expansion of existing lagoon	
	Capital Costs:	$ 1.0 in 1980 $ 0.7 in 1992 $ 1.7
	Present Worth:	$ 1.7
Longview	Expansion of existing oxidation ditch	
	Capital Costs:	$ 0.2
	Present Worth:	$ 0.6
Bragg Creek/Redwood Meadows	Pump sewage from Bragg Creek to Redwood Meadows and thence into Calgary for treatment	
	Capital Costs:	$ 5.9 in 1980 $ 2.3 in 1992 $ 8.2
	Present Worth:	$15.0
Cochrane to N.W. Calgary	Pump sewage into Calgary's system for treatment	
	Capital Costs:	$ 6.20 in 1980 $ 0.07 in 1992 $ 6.27
	Present Worth:	$24.40
Airdrie/Crossfield*	Pump sewage from Crossfield to Airdrie and then pump flows to Calgary for treatment	
	Capital Costs:	$ 8.3 in 1980 $ 4.1 in 1992 $12.4
	Present Worth:	$35.4

* Crossfield built own sewer treatment system so 1992 projection is void.

Appendix 1 - continued

Calgary Regional Utilities Study:
Costs for Recommended Water and Sewage Systems in 1980

Cost of Recommended Sewage Alternatives (Millions 1980 Dollars)

* Strathmore and Chestermere Lake	Pump sewage from Strathmore to Chestermere Lake and then pump combined flows to Calgary for treatment	
	Capital Costs:	$10.6 in 1980 $ 2.6 in 1991 $13.2
	Present Worth:	$37.0
Turner Valley, Black Diamond, Okotoks**	Sewage from Turner Valley to Black Diamond to Okotoks and thence to Calgary for treatment	
	Capital Costs:	$12.21 in 1980 $ 1.89 in 1991 $14.10
	Present Worth:	$39.10

* Strathmore will go with irrigation of waste water so Calgary Regional Utility Study projections are void.

** Okotoks expanded in 1980, so projection is void.

Appendix 2

CITY OF CALGARY WATER AND SEWAGE CAPACITIES

(extracts from City of Calgary Submission to Local Authorities Board Annexation Hearing, March, 1989)

WATER TREATMENT FACILITIES

Currently, the Glenmore Water Treatment Plant is operating at its ultimate design capacity of 140 million gallons per day (640 million litres per day). The Bearspaw Water Treatment Plant currently has a capacity of 160 million gallons per day (730 million litres per day) which is sufficient to meet the City's needs until the turn of the century. The Bearspaw Plant, with future expansions, will have an ultimate design capacity capable of supplying demands of the annexation lands.

SEWAGE TREATMENT PLANTS

The City of Calgary presently owns and operates two sewage treatment facilities. They are the Bonnybrook Treatment Plant and the Fish Creek Treatment Plant. The Bonnybrook Plant accommodates a drainage area covering nearly two thirds of the City. It currently has a capacity of 99 million gallons per day (450 million litres per day). An expansion scheduled for the 1992-1997 period will increase the plant's capacity to 136 million gallons per day (620 million litres per day). This will be sufficient to service development to the year 2026 in the Nose Creek and West Calgary catchment areas within the annexation area.

The Fish Creek Plant currently services the southerly portion of the City and has a capacity of 16 million gallons per day (73 million litres per day). An expansion planned for the 1990-94 period will double the capacity of the plant. The expansion will provide capacity to handle flows from portions of the annexation area. The balance of the annexation area in the south and southeast will be serviced by the future Pine Creek Sewage Treatment Plant.

Appendix 3

WATER AND SEWAGE SYSTEM CAPACITIES FOR BEISEKER, BRAGG CREEK, BLACK DIAMOND, CANMORE, CHESTERMERE LAKE, CROSSFIELD, IRRICANA AND TURNER VALLEY

BEISEKER
POPULATION 518

Water System

description	population capacity
4 wells with chlorination	2,000 @ 90 igcd

Sewage System

description	population capacity
Lagoon system - 2 anaerobic cells, 1 facultative cell, 1 storage cell	700 @ 50 igcd

BRAGG CREEK
POPULATION 505

Water System

description	population capacity
Infiltration Gallery at Elbow River	700 @ 50 igcd

Sewage System

description	population capacity
Private systems. Problems with groundwater contamination.	

BLACK DIAMOND
POPULATION 1,436

Water System

description	population capacity
3 wells with chlorination	2,400 @ 300 igcd

Sewage System

description	population capacity
Lagoon system - 2 facultative cells, 1 storage cell	1,300 @ 150 igcd

CANMORE
POPULATION 4,419

Water System

description	population capacity
Surface Water Source from Spray Lakes. Chemical addition, clarification, filtration and chlorination	8,500 @ 100 igcd

Sewage System

description	population capacity
Mechanical Treatment with continuous discharge to Bow River	8,000 @ 150 igcd

Appendix 3 - cont'd

CHESTERMERE LAKE
POPULATION 609

Water System

description	population capacity
Private wells	unknown

Sewage System

description	population capacity
Pipeline to Calgary (10")	3,000 @ 80 igcd

CROSSFIELD
POPULATION 1,417

Water System

description	population capacity
Supply line (10") from Mountainview Regional Water Plant	1,800 @ 60 igcd

Sewage System

description	population capacity
Lagoon System - 4 anaerobic cells, 1 facultative cell, 1 storage cell	3,000 @ 90 igcd

IRRICANA
POPULATION 702

Water System

description	population capacity
2 wells with chlorination	1,500 @ 60 igcd

Sewage System

description	population capacity
Lagoon System - 2 anaerobic cells, 1 storage cell	500 @ 95 igcd

TURNER VALLEY
POPULATION 1,298

Water System

description	population capacity
4 wells with chlorination	2,250 @ 103 igcd

Sewage System

description	population capacity
Mechanical treatment (aerated lagoons) with wastewater disinfection and continuous discharge to Sheep River	2,500 @ 100 igcd

Appendix 4

Transportation Update

The Terms of Reference for the Infrastructure portion of the Prospect project include monitoring the region's highway network. Alberta Transportation and Utilities, the provincial government department responsible for the region's highway network, has provided the Commission with data which may be useful to our region's municipalities, but which is too detailed and extensive to be included in this report. The data is in a computer printout format and is called Traffic Volume Breakdown on Primary, Secondary and Other Roads, 1980-87. It contains AADT data which is the average daily traffic expressed as vehicles per day for the period of January 1st to December 31st. It also contains ASDT data which is the average summer daily traffic expressed as vehicles per day for the period of May 1st to September 30th. If municipalities are interested in examining this data they should contact Regional Planning Services.

Alberta Transportation and Utilities also provided the Commission with a list of future highway construction projects. They are:

1. A ring road circumventing Calgary has been proposed and will incorporate several transportation components such as the Stoney Trail, the East Ring Road, Highway 22X, Sarcee Trail and Highway 8. The timing for the completion of this network is indeterminate.

2. Highway 1A (Cochrane to Calgary): This section of Highway 1A will be twinned within the next 10 years with extensive access control to be implemented.

3. Highway 2 (North of Calgary): This will be subject to more stringent access control measures but the system will remain as a 4-lane divided facility.

4. Highway 2 (South of Calgary): This will be converted to a divided facility from a 4-lane undivided system with the implementation of additional access control.

5. Highway 2A (High River to Okotoks): This section will be upgraded to a 2-lane undivided standard.

6. Highway 22 (Longview South): This will be upgraded and paved south to the boundary of the M.D. of Foothills.

7. Highway 22 (Highway 66 to Highway 8): This section is being considered for improvements but upgrading will be dependent on negotiations with the Sarcee Band. When this is upgraded, it will remain as a 2-lane undivided facility.

Future transportation issues for our region, in the view of Alberta Transportation and Utilities, will be a greater emphasis on transportation studies, the staged construction of the Calgary ring road system and the development of truck routes.

Appendix 4 - continued)

Transportation Update

In the coming year, the Commission will be working jointly with Alberta Transportation and Utilities to develop a Calgary Regional Travel Forecasting Model. The department sees a need to develop a detailed regional scale model that can address various transportation issues beyond the City of Calgary boundaries. When this model has been constructed, the region will have long term regional travel forecasts and the ability to use the model in future years to prepare additional forecasts.